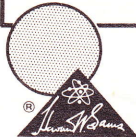
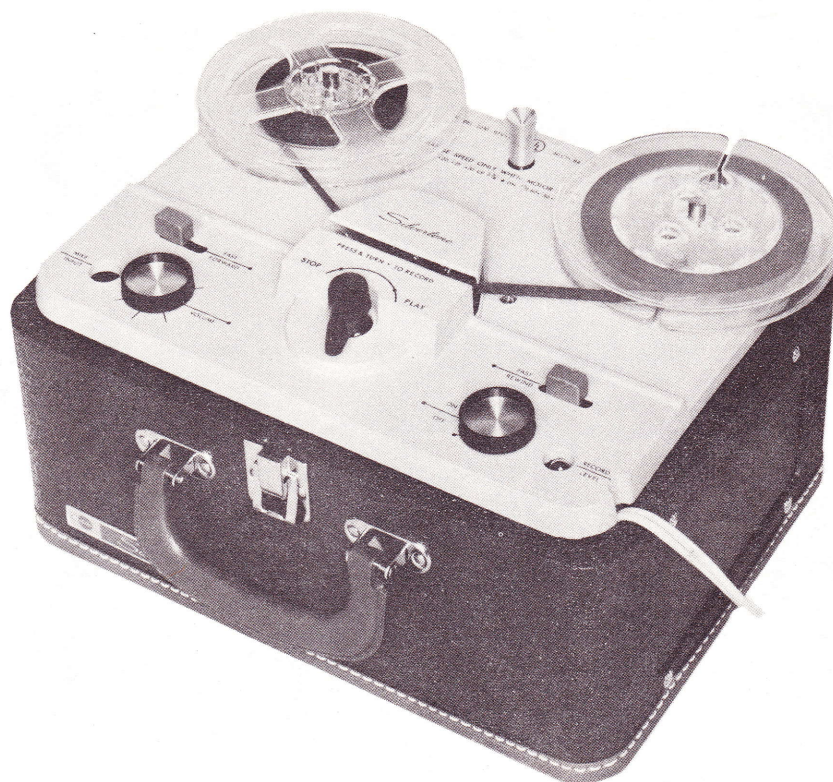


PHOTOFACT® Folder

SILVERTONE MODEL
2230 CH. 528.59600SILVERTONE MODEL
2230 CH. 528.59600SILVERTONE MODEL
2230 CH. 528.59600

GENERAL INFORMATION

The Silvertone Model 2230 tape recorder is a two-speed recorder that records and plays back two tracks of material on standard width recording tape.

Recordings may be made from a phonograph, radio, television receiver, or from a microphone.

The tape speeds are $7\frac{1}{2}$ and $3\frac{3}{4}$ ips. Using both tracks, the recording times are as follows:

Reel Size	$7\frac{1}{2}$ ips	$3\frac{3}{4}$ ips
5" (600 ft.)	$\frac{1}{2}$ hour	1 hour
7" (1200 ft.)	1 hour	2 hours

Operate this recorder on 60 cycle, 110-120 volt AC supply only.

Supplied By:

Sears, Roebuck & Co.
925 South Homan Avenue
Chicago 7, Illinois

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana



The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of CQ541

the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1962 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

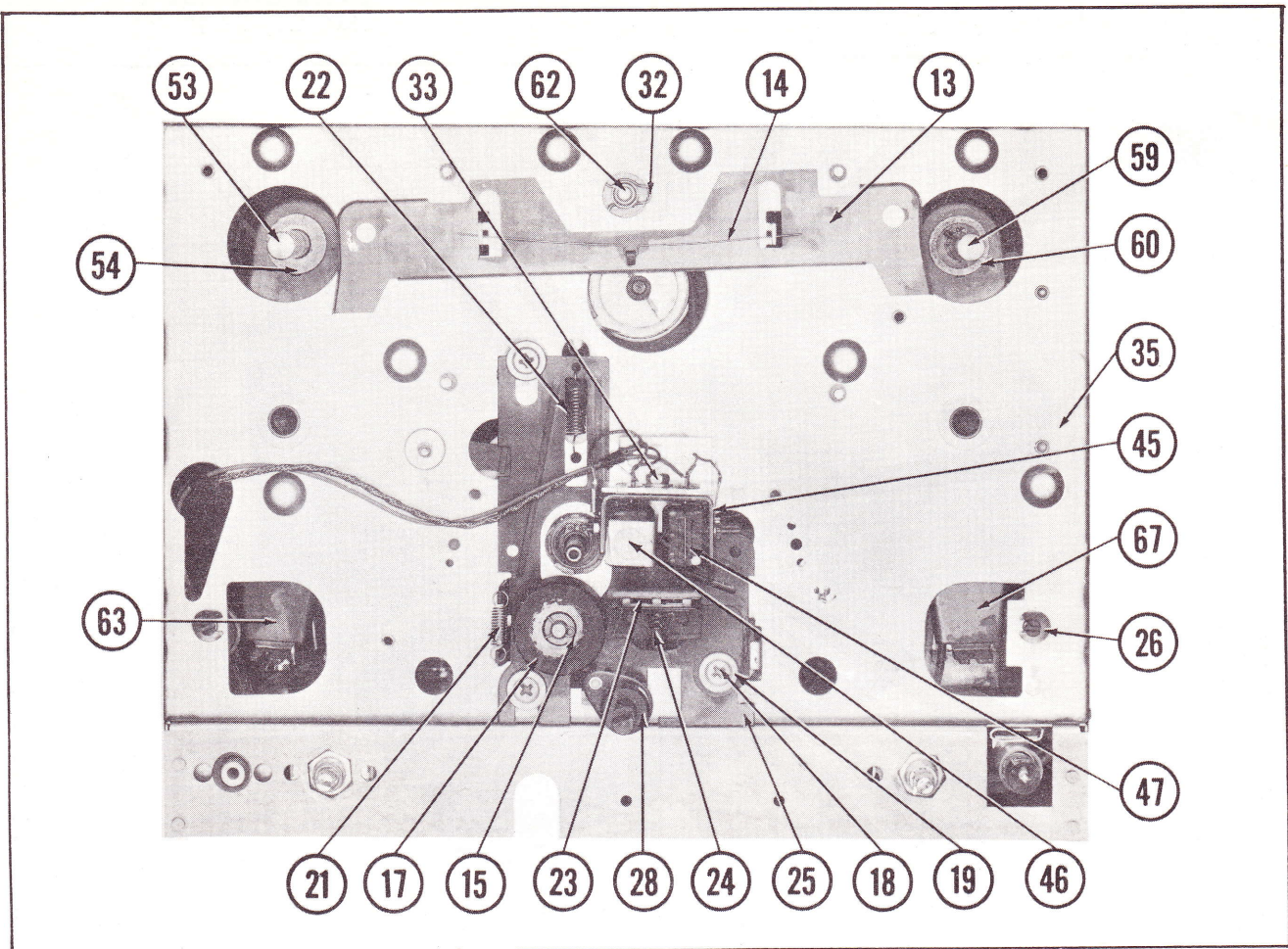


FIG. 1 TOP VIEW OF MECHANISM WITH COVERS REMOVED

FUNCTION OF CONTROLS

Record-Play

When in the Stop position, the brake plate (13) engages the supply and take-up reels. When in the Play or Record position, the brake plate is disengaged from the reels and allows them to rotate.

Rewind

Moving this control to the left rewinds the tape onto the supply reel at a fast speed. Do not operate this control unless the Record-Play control is in the Stop position.

Fast Forward

This control, when moved to the right, winds

the tape onto the supply reel. Do not operate this control unless the Record-Play control is in the Stop position.

Volume

Controls the volume level during Play and the recording level during Record.

Speed Change

Selects either 7 1/2 or 3 3/4 ips tape speed. Depress the knob for 7 1/2 ips; pull the knob up for 3 3/4 ips operation. Do Not operate speed change knob unless motor is running.

OPERATING INSTRUCTIONS

Threading the Tape

1. Place a reel of tape on the right (supply) spindle and an empty reel on the left (take-up) spindle.
2. Unwind approximately 12 inches of tape from the right (supply) reel. (Record-Play control must be in Stop position.) Hold a section of tape taut and insert in tape slot, making sure dull-coated side of tape faces rear of recorder.

3. Insert free end of tape into one of the radial slots in the hub of the empty reel. Turn reel several turns clockwise until tape is secured to reel and all slack is taken up between reels.

To Record

1. Insert microphone plug into microphone input jack on top of recorder.

2. Turn the On-Off control to the "On" position and allow sufficient time for the tubes to warm up.
3. Thread tape as described under "Threading the Tape".
4. Depress Record-Play control knob and turn to Play position.
5. Adjust Volume control until recording level indicator flashes on high peaks only.

To record from a radio, phonograph, or television receiver, follow this same procedure. Set the Volume control at normal level. Stop the recording by turning the Record-Play control to the Stop position.

To Wind or Rewind Tape

1. Set Record-Play control to Stop position.
2. Wind the tape onto the left (take-up) reel by moving the Fast Forward control to the right and hold until the desired portion of tape is reached. To stop the tape release the control.
3. To rewind the tape, move the Rewind control to the left and hold until the desired portion of tape is reached. Release the control to stop the tape.

To Play a Recording

1. Follow instructions under "Threading the Tape".
2. Turn on recorder and allow sufficient time for tubes to warm up.
3. Turn Record-Play control to the Play position.
4. Adjust Volume control for desired listening level.
5. Turn Record-Play control to Stop position at the end of the recording.

CAUTION: Do not depress Record-Play control when playback is desired as previously recorded material on the tape will be automatically erased.

DISASSEMBLY

To Remove Recorder from Case

1. Remove case top.
2. Remove two screws from rear of case and two screws from bottom of case.
3. Lift transport and amplifier out of case far enough to unsolder speaker wires.
4. Remove recorder from case.

Erasing Recorded Material

Any recording on the tape is automatically erased as new material is being recorded. To erase a recording without putting new material on the tape, follow the normal recording procedure, but leave the microphone disconnected and the Volume control at its extreme counterclockwise position.

To Edit and Splice Tape

NOTE: Since one track cannot be edited and spliced without affecting the other track, recordings to be edited should be limited to one track only.

1. Tape may be edited by cutting out unwanted portions or by rejoining selections into another sequence. Announcements may be inserted between selections etc. Unused sections can be spliced for reuse.
2. For best results, cut tape at a slight diagonal and join ends with splicing tape on the glossy side. Trim off any excess width.

Dual-Track Recording

One-half of the tape width is recorded at a time; thereby, resulting in two-track recording. This two-track recording is accomplished in the following manner:

1. After a reel of tape has been recorded, and all tape is wound onto the left (take-up) reel, turn the Record-Play control knob to the Stop position.
2. Remove the tape reels from the recorder. Turn the reels over and place it on the right spindle. Place the empty reel on the left spindle.
3. Rethread the tape and proceed with the recording.
4. After the second track has been recorded, the first track can be played back without rewinding. To do this, reverse the reels as described in Step 2.

To Remove Amplifier from Tape Transport

1. Disconnect the two wires from the record-play head.
2. Remove the top wire from the erase head.
3. Remove the shield wire from the record head mounting bolt.
4. Remove four hex head sheet metal screws, two located at each end of the transport baseplate.

CLEANING

The pressure roller (17), capstan shaft, recording head (46), and erase head (47) will accumulate tape oxide coating, which wears off the tape as it

passes these parts. This oxide accumulation will cause poor performance of the recorder. Clean these parts with a cotton applicator dipped in head cleaner.

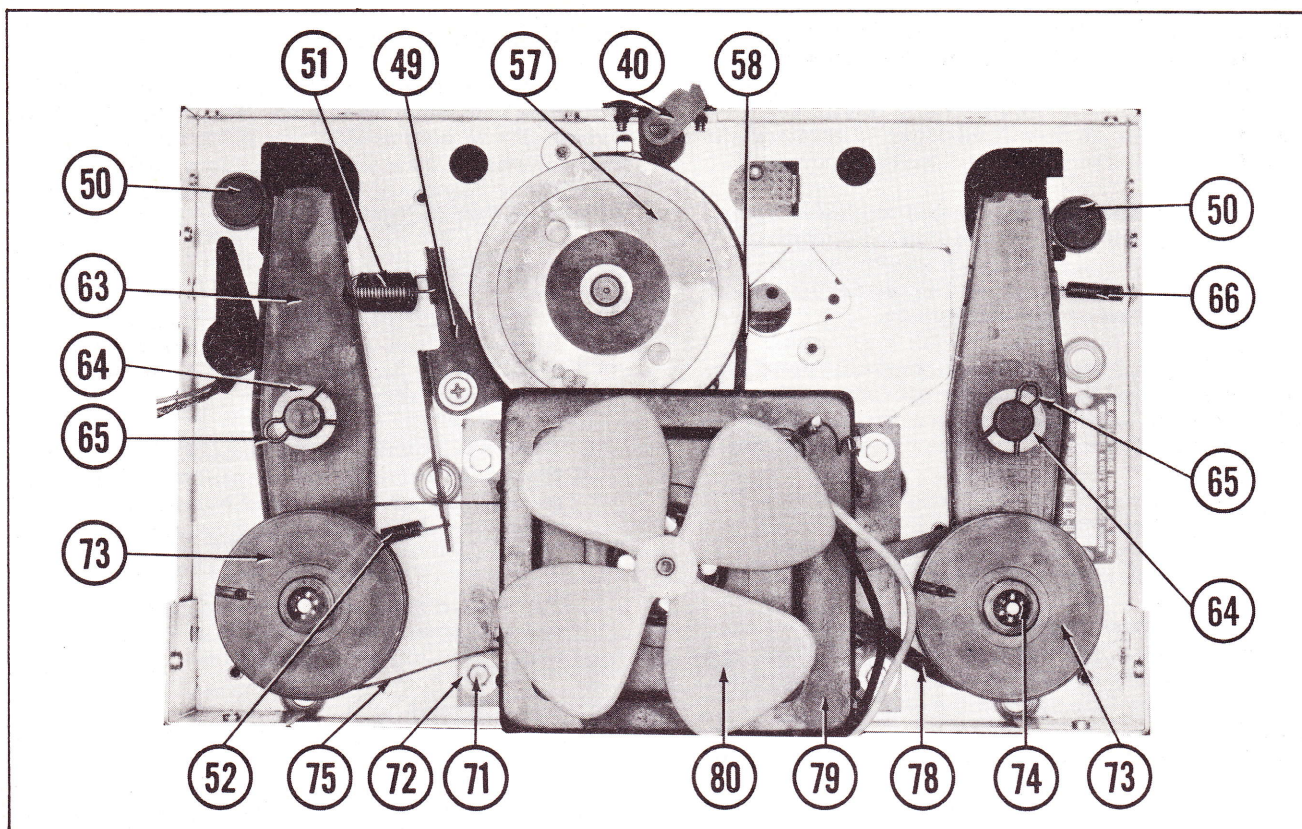


FIG. 2 BOTTOM VIEW OF MECHANISM

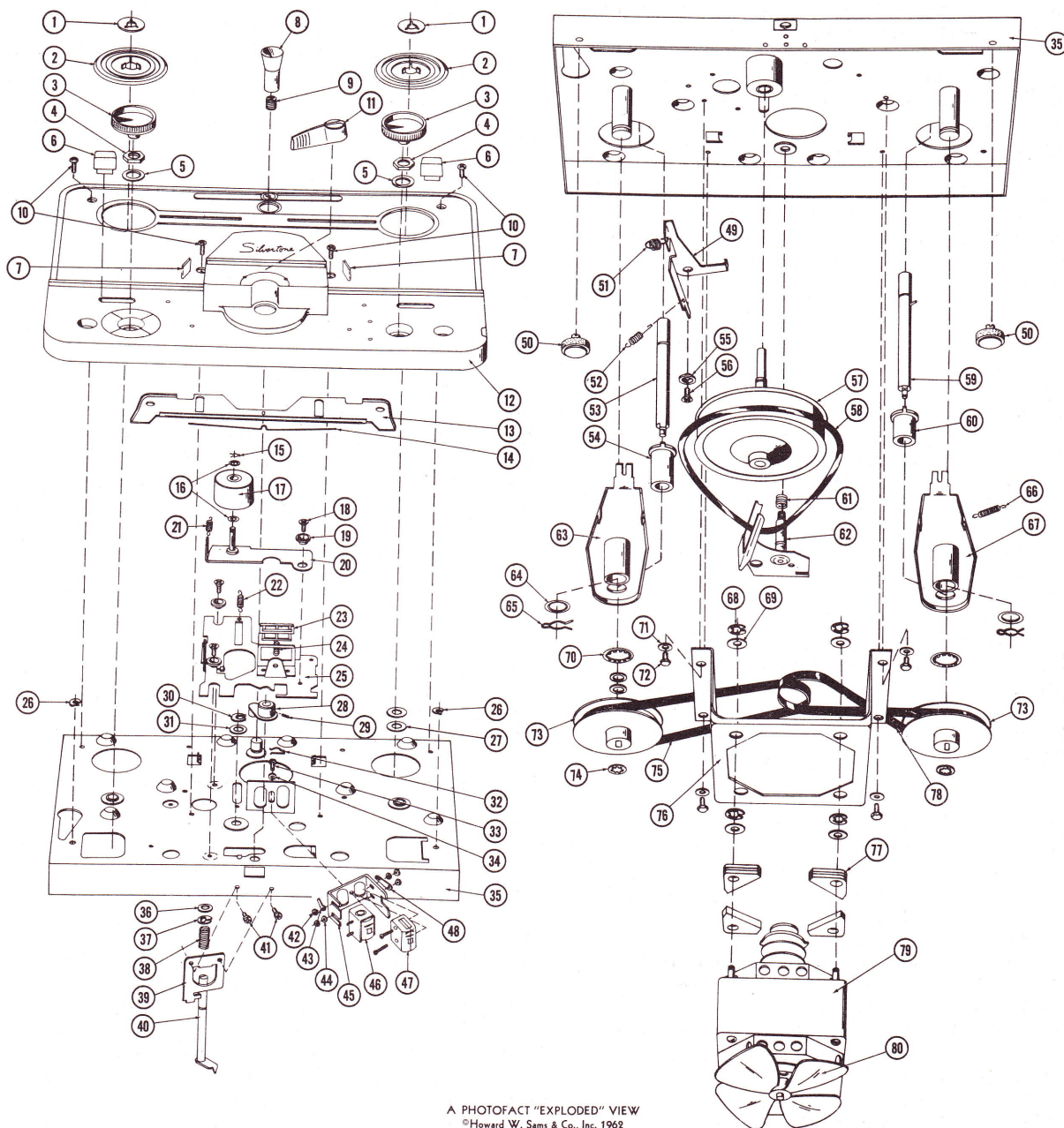
LUBRICATION

The lubrication applied at the time of manufacture should be sufficient for a long period of time. In cases of unusual use, high operating temperatures, or the replacement of a part, lubrication may be re-

quired. When lubricating the recorder, use a good quality lubricant making sure no oil or grease contacts the parts which the tape passes.

TROUBLE CHART

Symptom	Cause	Remedy
Fails to erase.	1. Erase head (47) not positioned properly. 2. Broken erase head wire. 3. Defective erase head.	1. Check head adjustment. 2. Repair or replace wire. 3. Replace head.
No Takeup in Record-Play position.	1. Broken drive belt (75). 2. Cams (50) misadjusted.	1. Replace drive belt (75). 2. Adjust cams (50).
Wow or Flutter.	1. Dirty capstan. 2. Defective pressure roller (17).	1. Clean capstan with alcohol. 2. Replace pressure roller (17).
No Record or Playback.	1. Defective Record-Play head (46). 2. Defective tube in amplifier. 3. Head misadjusted. 4. Broken head wire. 5. Defective Record-Play switch.	1. Replace head (46). 2. Check tubes in amplifier. 3. Check head adjustment. 4. Repair or replace wire. 5. Replace switch.
No Wind or Rewind.	1. Broken drive belt (75) or (78). 2. Defective motor.	1. Replace broken drive belt (75) or (78). 2. Replace motor.
Speed change does not work.	1. Bent or broken belt transfer assembly (62). 2. Broken "ears" on motor pulley.	1. Replace assembly (62). 2. Replace motor (79).



ABOVE MOTORBOARD

BELOW MOTORBOARD

FIG. 3 EXPLODED VIEWS OF MECHANISM

MECHANICAL ADJUSTMENTS

Record-Play and Erase Heads

The head height and azimuth are adjusted as follows:

Height — Loosen the head adjusting screw and move the head assembly until the top of the pole pieces of both heads are parallel with the top of the tape. Tighten the screw tight enough to just hold the head assembly in place.

Azimuth — Place a 12 kc prerecorded azimuth alignment tape on the recorder. Place the recorder in Play position. Move the head assembly back and forth for maximum output.

Reel Brakes

The brake adjusting cams (50) are accessible when the top plate (12) is removed. These cams are adjusted as follows:

1. Remove the top plate (12) and replace the reel plates (2).
2. Place a reel of tape on the recorder.
3. Wind some tape onto the take-up reel. Observe braking action when Fast Forward lever is released. There should be minimum of tape overrun.
4. Adjust cam (50) on left side of motorboard assembly. Again operate Fast Forward lever and release it. If tape still overruns, repeat the adjustment until minimum tape overrun is obtained.
5. Adjust cam (50) on the right side of motorboard assembly for braking action on Fast Rewind. Make this adjustment as described in Step 4 until minimum of tape overrun is obtained.

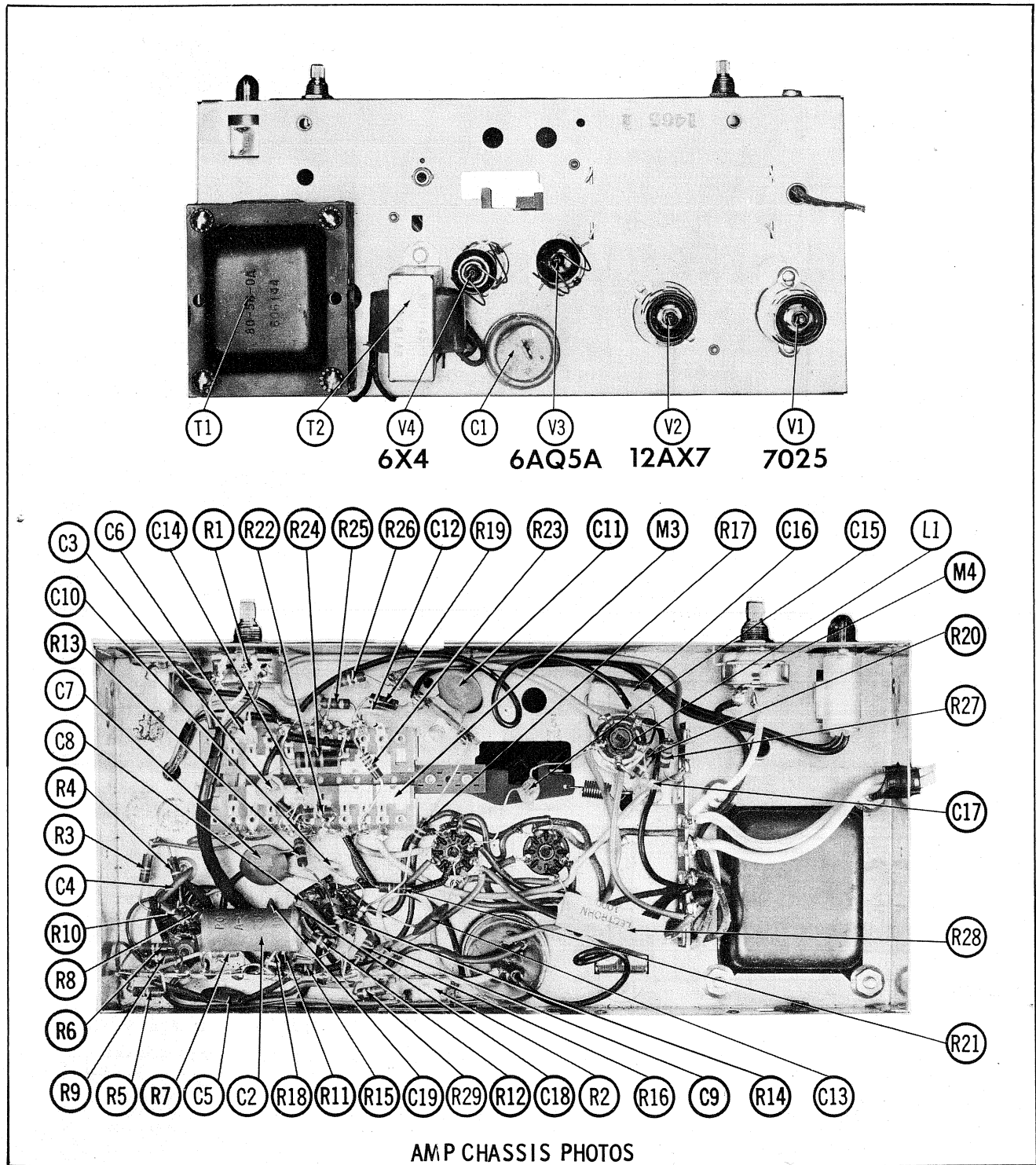
MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	22-238-0	Plastic Retainer	38	70-260-0	Spring, Record Release
2	84-12595	Assembly, Reel Plate	39	11-1046	Bracket, Shaft Positioning
3	52-1666-0	Knob, Volume and On/Off	40	84-12508	Assembly, Control Shaft and Lever
4	56-230	Hex Nut	41	57-604291	Screw, #6-32 NC2 x 1/4" Phil. Pan. Hd.
5	58-334	Washer, Flat .380 x .625 x .020	42	56-234	Nut, Hex. 2-56 x 3/16" x 1/16" D.C.
6	52-1752-0	Knob, Scanner	43	45-95-5	Lug, Solder
7	29-117-1	Tape Guide	44	58-295	Washer, Flat .092 x .218 x .018
8	52-1331-0	Knob, Speed Control	45	11-2033	Head Bracket
9	70-259-0	Spring, Compression	46	33-271-0	Head, Record/ Playback
10	97-954	Screw, #6 x 1/4" Phil. Pan. Hd.	47	33-306-0	Head, Erase
11	52-1668-0	Knob, Play/Record	48	45-8-5	Lug, Solder
12	31-430-1	Top Plate (Screened)	49	22-13-4	Lever, Takeup
13	29-112-1	Plate, Brake	50	39-104-0	Cam, Adjusting
14	70-429-0	Spring Brake Plate	51	70-250-0	Spring, Takeup
15	22-40-1	Hairpin Retainer	52	70-257-0	Spring, Left Brake
16	52-282	Washer, Flat	53	84-12441	Spindle Assembly (Left Hand)
17	39-37-5	Pressure Roller	54	26-205	Oilite Bearing (Left)
18	97-573	Screw, #6-32 NC2 x 1/4" Phil. Flat Hd.	55	72-135	Slide, Button
19	72-135	Button, Slide	56	57-604221	Screw, #6-32 x 1/4" Phil. Flat Hd.
20	84-3408	Pressure Roller Arm Ass'y.	57	84-9316	Capstan Shaft and Flywheel Assembly
21	70-381-0	Spring, Capstan Pressure	58*	62-79-0*	*Flywheel Drive Belt
22	70-251-0	Spring, Slide Return	59	84-12442	Spindle Assembly (Right Hand)
23	84-3401	Pressure Shoe and Pad Ass'y.	60	26-206	Oilite Bearing (Right)
24	70-253-0	Spring, Pressure Shoe	61	70-259-0	Spring Compression
25	84-12834	Pressure Plate Assembly	62	94-12850	Belt Transfer Assembly
26	22-46-1	Spring Clip	63	84-12743	Take-up Reel Arm Ass'y.
27	58-607	Washer, Nylon	64	58-289	Washer, Flat
28	84-12823	Lifter Arm and Set Screw Ass'y.	65	22-42-1	Hairpin Retainer
29	97-970	Set Screw #6-32 NC2 x 3/16" Hex Sckt. Cone Pt.	66	70-252-0	Spring, Right Brake
30	22-37-1	Ring Retainer	67	94-12744	Feed Reel Arm Assembly
31	58-372	Washer, Capstan	68	22-68-1	"E" Ring Retainer
32	70-256-0	Spring, Detent Plunger	69	58-187	Flatwasher, .203 I.D. x .438 O.D. x .031
33	57-803271	Screw, #8-32 NC2 x 3/16" Hex. Hd.	70	22-234-1	Retainer, Spring Grip
34	58-251	Washer, Flat .171 x .344 x .031	71	58-294	Washer, Flat .188 x .438 x .032
35	84-12746	Motorboard Assembly			
36	58-288	Washer, Flat			
37	22-38-1	Ring, Retaining			

MECHANICAL PARTS LIST (CON'T.)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
72	57-803271	Screw, #8-32 NC2 x 3/16" Hex. Hd.	77	37-58-3	Rubber Grommet
73	84-12804	Spindle Pulley Assembly	78*	*39-40-5	*Drive Belt
74	22-228-1	Retainer, Spring Grip	79	84-12278	Motor and Bracket Assembly (Inc. items 68, 69, 76 and 77)
75*	*83-1422	*Drive Belt	80	83-1447	Fan
76	11-1959	Motor Bracket			

- * Item 58 Flywheel Drive Belt WALSCO Part No. 1410-10
* Item 75 Drive Belt WALSCO Part No. 1409-03
* Item 78 Drive Belt WALSCO Part No. 1409-03



ELECT. PARTS LIST AND DESCRIPTIONS

TUBES					
AMPEREX		GENERAL ELECTRIC		RAYTHEON	
ITEM No.	USE	TYPE		ITEM No.	USE
V1	Preamplifier	7025A		V3	Output-Bias Osc.
V2	AF Amplifier	12AX7		V4	Rectifier
					6AQ5A
					6X4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA					
	CAP.	VOLT.	Silvertone PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	SPRAGUE PART No.
C1A	40	350				QT2-8	TCD-2274	TDLD-E1
B	40	300	18-32-2			QTI-14	TC78	TD-40-350
C	40	300		PRS1260	BBR25-25	MT1-11	TC26	MLV25-25
C2*	25	25	18-52-5					TVA-1205

FIXED CAPACITORS

ITEM No.	RATING		REMARKS	REPLACEMENT DATA					
	CAP.	VOLT.		AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENDO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	120	10%		DI-120	DD-121	L10T12	CCD-121	GP312	10TS-T12
C4	.02			BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C5	.02			BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C6	470	10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C7	.02			BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C8	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C9	.001			BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C10	470	10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C11	.02			BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C12	75	10%		NPO-DI 75	DD-750	L10Q75	CCD-750	GP475	10TS-Q75
C13	.02			BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C14	470	10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C15	.002		Note 1	BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C16	.003	10%		1464-003		IR5D3	CM-20B-302K	MCE461	MS-23
C17	470	10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C18	10	N750 10%		N750-DI 10	DTN-10	C10Q1U	CCTN-100	CN7-410	10TCU-Q10
C19	10	N750 10%		N750-DI 10	DTN-10	C10Q1U	CCTN-100	CN7-410	10TCU-Q10

Note 1. Part of L1.

CONTROLS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	USE	RESISTANCE	REPLACEMENT DATA			
			Silvertone PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.
R1	Volume	500K	24-507	B-60, or (AB-60, AK-1)	A47-500K-Z/ KSS-3	Q13-133, or (BUI, CF25, SSL, DC1)*
R2	Hum Adjust	200Ω 1W	24-455		39-200	U48, (UA55A, SK-1000) FL-200

* "SNAPTROL".

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN PART No.	REMARKS			IRC PART No.	WORKMAN PART No.	REMARKS
R3	27K				R17	220K			
R4	1meg				R18	2200Ω			
R5	100K				R19	1meg			
R6	220K				R20	2.2meg			
R7	4700Ω				R21	68K			
R8	470K				R22	150K			
R9	220K				R23	470K			
R10	4700Ω				R24	270Ω 1W			
R11	220K				R25	5.6meg			
R12	100K				R26	560K			
R13	680Ω				R27	47K			
R14	220K				R28	1000Ω 5W	PW5-1000	5W-SQ-1000	
R15	220K				R29	15K			
R16	100K								

ELECT. PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Silvertone PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman PART No.	
L1	Bias Osc. (52.5KC)	10-71-4 ①					① Includes C16

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	Silvertone PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117VAC ④ .25A	500VAC ④ .040A	6.3VAC ④ 1.7A	80-56-0 (80-56-0A)	P-3047	PM8418	22R00 ①	R-106B ①	① Tape 5V Winding & 6.3V CT

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	Silvertone PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5000Ω	6-8Ω	80-145-1 (80-145-1A)	A-2900	A-3856	24S09	S-51X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Silvertone PART No.	QUAM PART No.	
SP1	4"x 6"	PM	6-8Ω	33-519-4	46A07Z8	

MISCELLANEOUS

ITEM No.	PART NAME	Silvertone PART No.	NOTES
M1	Head	33-271-0	Record-Play
M2	Head	33-306-0	Erase
M3	Switch	69-238-0	Record-Play (2 Position Slide Type, Spring Loaded Normally in Play Position)
M4	Switch	69-385-0	Power On-Off
	Microphone	33-54-1	

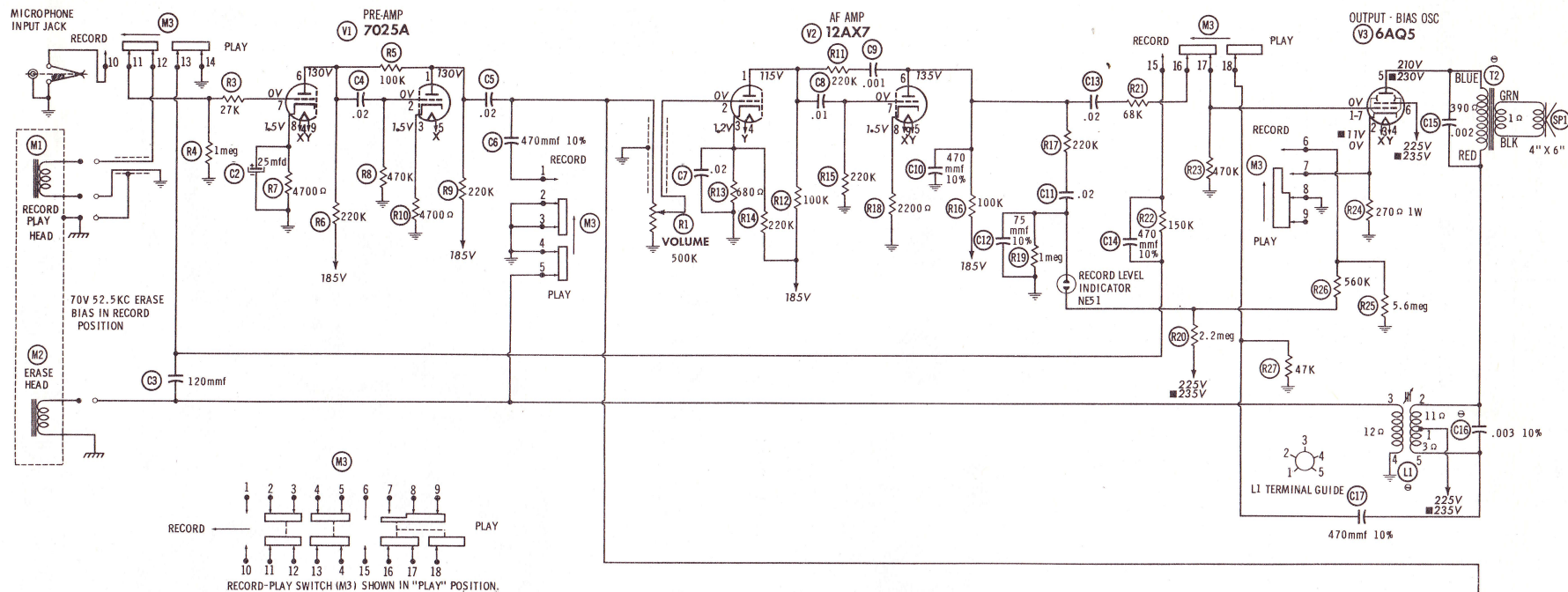
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	32-1666-0	Volume, On-Off
Knob	52-1668-0	Play-Record
Knob	52-1752-0	Scanner
Knob	52-1331-0	Speed Control

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Power Cord	Use BELDEN No.	17106 (Plastic) or 17126 (Rubber) - 6 Ft. 17109 (Plastic) or 17129 (Rubber) - 9 Ft.
Power Cord (Interlock Type)	Use BELDEN No.	8874 (Rubber) or 8895 (Plastic)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401 or 8421
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor-Unshielded) 8429 (Two Conductor-Shielded) 8419 (Three Conductor-Shielded)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	7025	†236K	470K	4.7K	FIL	FIL	†236K	1meg	4.7K	FIL
V2	12AX7	†116K	0Ω	680Ω	FIL	FIL	†116K	220K	2200Ω	FIL
V3	6AQ5A	470K	270Ω	FIL	FIL	†1390Ω	†1000Ω	470K		
V4	6X4	415Ω	NC	FIL	FIL	NC	445Ω	†200K		

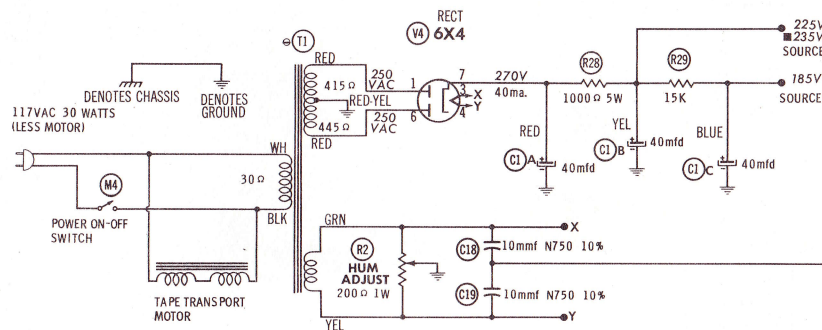
ALL MEASUREMENTS MADE IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED.
 ■ MEASURED IN "RECORD" POSITION. NC NO CONNECTION
 † MEASURED FROM PIN 7 OF V4.
 † THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.

SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

- DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
- Socket connections are shown as bottom views.
- Measured values are from socket pin to common ground.
- Line voltage maintained at 117 volts for voltage readings.
- Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
- All controls at minimum, proper output load connected.

A PHOTOFAC STANDARD NOTATION SCHEMATIC
 ©Howard W. Sams & Co., Inc. 1962

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.



SILVERTONE MODEL
 2230 CH. 528.59600